SEISMIC SAFETY PLAN

DEPARTMENT OF CITY PLANNING ▫ LOS ANGELES CALIFORNIA

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cover by: richard v. david

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SEISMIC SAFETY PLAN

A portion of the General Plan of the City of Los Angeles

Approved by the City Planning Commission, July 3, 1974
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Department of City Planning
Los Angeles, California

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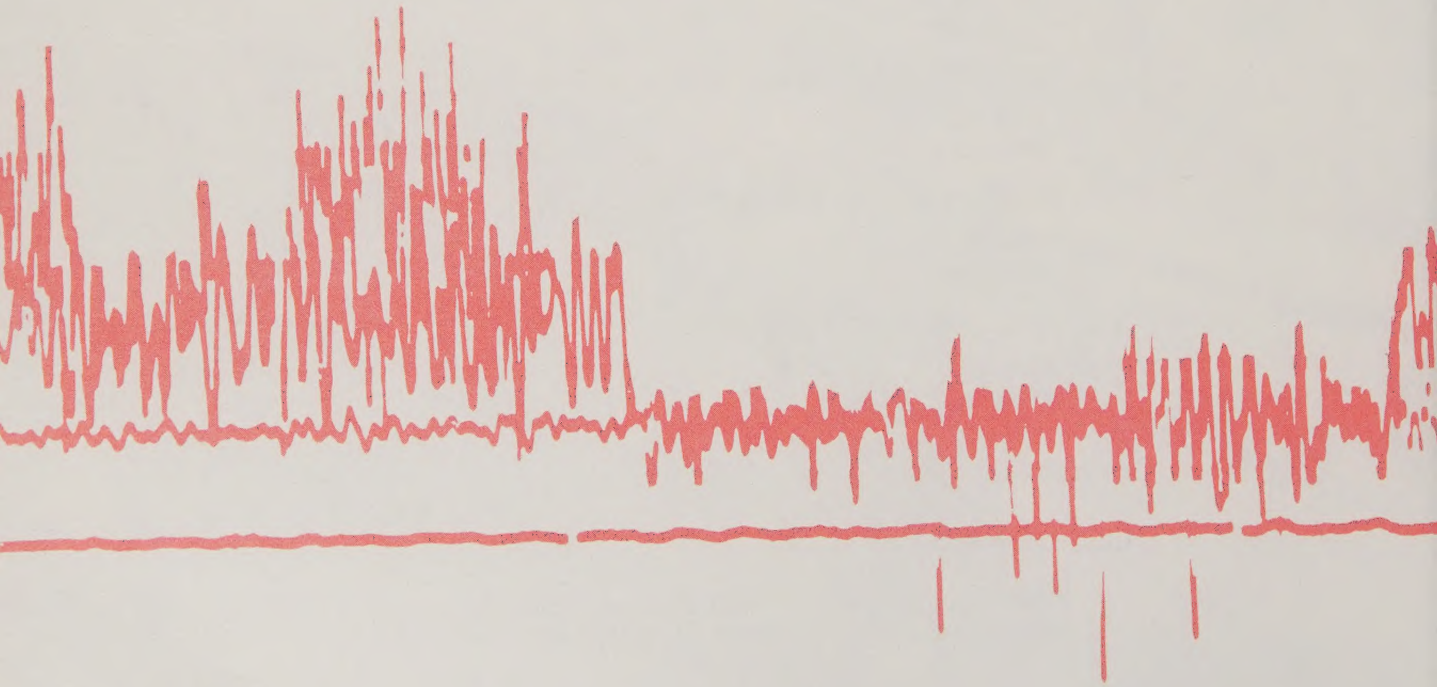
INTRODUCTION

The Seismic Safety Plan is an element of the General Plan of the City of Los Angeles and conforms to the provisions of Section 65302 (f) of the California State Government Code:

> *A seismic safety element consisting of an identification and appraisal of the seismic hazards such as susceptibility to surface ruptures from faulting, to ground shaking, to ground failures, or to effects of seismically-induced waves such as tsunamis and seiches.*
>
> *The seismic safety element shall also include an appraisal of mudslides, landslides, and slope stability as necessary geologic hazards that must be considered simultaneously with other hazards such as possible surface ruptures from faulting, ground shaking, ground failure and seismically-induced waves.*

The geological environment in and around the City of Los Angeles will subject the City to intense ground shaking in the event of a moderate or major earthquake. This can result in loss of life, personal injuries, damage to property, and economic and social dislocations. Much of this loss is preventable and the Seismic Safety Plan proposes measures to minimize these losses. It must be recognized that all aspects of life involve some degree of risk. Minimizing risk often results in higher dollar costs. The final decision is a balance of the costs involved and the level of risk to be accepted. This Plan attempts to incorporate this concept of "balanced risk".

An earthquake is caused when the accumulation of strain and strain energy along a fault in the earth's crust exceeds the elastic strength of the rocks. A sudden rupture occurs, releasing the stored energy and creating vibration waves that spread from the earthquake focus, or the point of

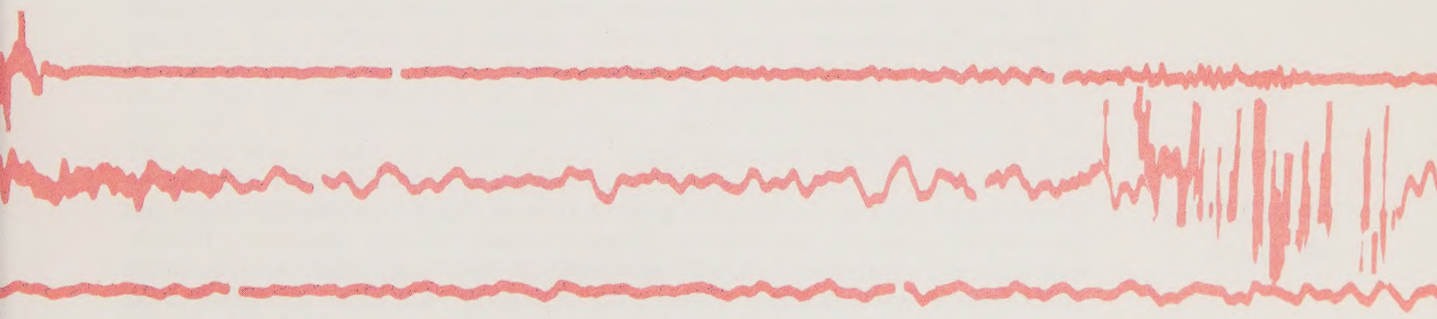


initial rupture. These phenomena cause permanent changes in the earth's topography and may cause extensive damage to man and his structures. There are three basic earth material failure mechanisms associated with an earthquake: shaking, breaking and water-damage.

Shaking causes the greatest amount of damage from earthquakes occurring in rather populous areas. It is estimated the majority of structural failure that has been caused by earthquake results from: (1) shaking which damages the structure directly, (2) shaking which causes soil failure beneath the foundation of a structure, and (3) shaking which causes the soil beneath the foundation to densify and settle, thus causing the structure to fail.

Breaking of the earth can be caused by four different processes: (1) faulting resulting from the displacement of two portions of the earth along the fault plane; (2) lurching, or the surface cracking and rupturing of soils at places other than directly along faults, caused by the inability of large masses of unconsolidated soils to support shaking accelerations; (3) liquefaction which occurs when the shaking action causes saturated soils to lose their strength; and (4) slope failure resulting from shaking action causing landslides.

Water damage can result from either a tsunamis or a seiche. Tsunamis are sea waves generated by earthquakes that displace the ocean bottom, massive landslides or volcanic action beneath the sea floor. It can cause severe property damage or life loss. Seiche results from the shaking of a body of water, such as a bay, lake or pond. Again, the water waves could cause severe damage to structures and death or injury to persons in the path of the water waves.



The Seismic Safety Plan consists of this text and the accompanying maps (plates) entitled (I) Fault rupture study areas and (II) Slope stability study areas.

PURPOSES AND USES

The Plan is designed to serve as an official guide for the use of the City Council, the Mayor, and the City Planning Commission, other concerned governmental and private agencies, and individual citizens, on the nature and extent of seismically-associated geologic hazards in the city. For the City Council, the Mayor, and the City Planning Commission, the Plan provides a reference to be used in connection with their decisions on developmental, implementation, and hazard abatement matters within the City.

The policies and programs in this Plan are intended to provide direction and a course of future action for the City and its Departments. As such, this Plan is not intended to mandate the City, or its various departments to commence any new programs which may require the expenditure of man hours or funds. Any such actions called for in this Plan requiring additional funding must be brought individually to the Council through the budgetary process.

The Plan is intended to protect and enhance the public health, safety and welfare within an acceptable level of risk as determined by Council and the public. Although the Plan does not precisely determine land uses, geologic and seismic considerations should play a major role in determining land use. A primary purpose of the Seismic Safety Plan is to provide information necessary for warranted revisions in the General Plan, in order to respect geological hazard limitations. It is intended to supplement, and not limit, the actions prescribed by other required elements.

As conditions change over time, and new knowledge becomes available, it will be necessary to amend the Plan. It is intended that this review of Plan proposals be conducted at intervals not exceeding five years to ensure a plan commensurate with current seismic knowledge. Revisions to the Plan may also be initiated by a request from the City Council or the City Planning Commission.

FEATURES OF THE PLAN

Three major failure modes can lead to human injuries or property damage because of a seismic occurrence. These include shaking (structural failure, soil failure, settlement), breaking (faulting, lurching, liquefaction, slope failure), and water damage (tsunami and seiche). The Plan identifies areas within the City that may be subject to one or more of these failure modes consistent with policy risk levels. Mitigation measures to protect both existing and future construction in these areas are recommended.

The Plan maps indicate those areas of the City that will require specialized engineering reports for all new construction. Included also are criteria governing the basic content of such reports.

A major seismically-related problem faced by the City is the strengthening or abatement of existing earthquake hazardous buildings. Recognizing the potential for massive economic dislocations that would result if a full-scale program were instituted at one time, the Plan recommends that priorities for abatement be set based upon method of construction, hazard to life, occupancy, physical condition and location. A systematic time-phased program that begins now could result in hazard abatement within the life of this Plan. Ongoing City programs that result in the removal of hazardous buildings from the scene, although at a much slower rate, are also recommended for continuance.

There is a need to continue balancing building structural strength with adequate strength of nonstructural elements, such as elevators, ceilings and light fixtures, utility lines and electrical-mechanical equipment. The Plan proposes that measures continue to be taken to improve the effectiveness of design techniques and the quality of construction to decrease seismic risk.

It is important for post-disaster recovery that critical facilities such as police and fire stations, hospitals, dams and reservoirs, power facilities, and emergency communication systems remain operative after an earthquake. Evacuation from an area the size of the City will be virtually impossible, and may not be necessary if adequate facilities are operable to take care of injured or displaced persons. Such evacuation as does take place would be local, i.e. from heavily damaged or threatened areas to safer ones nearby. The Plan proposes land use restrictions on the siting of new facilities. Existing facilities are recommended for upgrading or removal if they do not meet lateral force requirements.

A major concern is the possible blockage of a section of freeway by the damage and/or collapse of freeway bridges. These freeways are a vital part of the City's transportation network and alternate routes should be planned to route traffic around the blockages. Selected city bridges may need to be upgraded or replaced to meet acceptable seismic requirements.

A special concern which requires coordination among State and City agencies is potential dam failure. The water may overtop the dam, the dam may fail by the added force caused by the earthquake shaking, or it may fail by liquefaction of the earth materials comprising the dam, especially if it was constructed utilizing such methods as hydraulic fill. The sudden torrent of water could cause property damage and life loss within the downstream inundation area. Where necessary, existing facilities are recommended for upgrading or removal.

Measures to promote emergency preparedness are proposed. The problem of continually maintaining public awareness is recognized, particularly since earthquakes do not strike predictably. However, the Plan stresses the need for adequate preparation on both the governmental and citizen levels to implement action in the event of a disaster.

STANDARDS AND CRITERIA

Levels of Acceptable Risk

The Joint Committee on Seismic Safety of the California Legislature has recommended a scale of acceptable risk, Table 1, p.5

Grading

The *Los Angeles City Building Code* sets forth the specific requirements of any individual engaging in grading and concomitant activities, particularly in the officially designated hillside areas (see Plate II, inside back cover). Subjects covered in the ordinance are adopted by reference and include the following:

- Limitation of soil export and import in hillside areas
- Excavations
- Fills
- Planting and irrigation of hillside areas
- Erosion control and drainage devices
- Areas subject to slides and unstable soils.

Liquefaction

Where saturated conditions exist near the ground surface, the possibility of liquefaction should be considered prior to development. Detailed liquefaction studies may be required for structures of Importance Factors 1-3 (see Table 1.)

Tsunamis

Tsunamis are highly uncommon in the Los Angeles area because of protection offered by the Santa Barbara Channel islands and Point Conception.

Endangered areas on the shoreline shall be defined as those with elevations less than 10 feet above mean sea level.

Seiches

Seiches can be expected in the harbor area and in reservoirs, bays, lakes and ponds. Risk from this seismic effect is considered to be low relative to risks from shaking, liquefaction, and slope failure.

Non-Structural Elements

Damage may be incurred by portions of a building that do not affect its basic construction. Such elements include light fixtures and ceilings, elevators, utility lines and electrical-mechanical equipment. Even though such damage is not structural, it can be extensive enough to render a building unusable after a major earthquake if adequate precautions are not taken.

TABLE 1. A SCALE OF ACCEPTABLE RISKS

Importance Factor	Level of Acceptable Risk	Kinds of Structures	Extra Project Cost Probably Required to Reduce Risk to Acceptable Level
1	Extremely low (a)	Structures whose continued functioning is critical, or whose failure might be catastrophic: nuclear reactors, large dams, power intertie systems, plants manufacturing or storing explosives or toxic materials.	No set percentage (whatever is required for maximum attainable safety)
2	Slightly higher than under level 1(a)	Structures whose use is critically needed after a disaster: important utility centers; hospitals; fire, police, and emergency communication facilities; fire stations; and certain bridges and overpasses that are part of a critical transportation element; also smaller dams.	5 to 25 percent of project cost (b)
3	Lowest possible risk to occupants of the structure (c)	Structures of high occupancy, or whose use after a disaster would be particularly convenient: schools, churches, theaters, large hotels, and other high-rise buildings housing large numbers of people, other places normally attracting large concentrations of people, civic buildings, secondary utility structures, extremely large commercial enterprises, most roads, alternative or noncritical bridges and overpasses.	5 to 15 percent of project cost (d)
4	An "ordinary" level of risk to occupants of the structure	The vast majority of structures: most commercial and industrial buildings, small hotels and apartment buildings, and single family residences.	1 to 2 percent of project cost, in most cases (2 to 10 percent of project cost in a minority of cases)(e)

Source: *Meeting the Earthquake Challenge,* Final Report to the Legislature, State of California, by the Joint Committee on Seismic Safety, January 1974. Part One: A Comprehensive Approach to Seismic Safety, p. 9.

a. Failure of a single structure may affect substantial populations.

b. These additional percentages are based on the assumption that the base cost is the total cost of the building or other facility when ready for occupancy. In addition, it is assumed that the structure would have been designed and built in accordance with current codes. Moreover, the estimated additional cost presumes that structures in this acceptable-risk category are to embody sufficient safety to remain functional following an earthquake.

c. Failure of a single structure would affect primarily only the occupants.

d. These additional percentages are based on the assumption that the base cost is the total cost of the building or facility when ready for occupancy. In addition, it is assumed that the structures would have been designed and built in accordance with current codes. Moreover, the estimated additional cost presumes that structures in this acceptable-risk category are to be sufficiently safe to give reasonable assurance of preventing injury or loss of life during an earthquake, but otherwise not necessarily to remain functional.

e. "Ordinary risk": Resist minor earthquakes without damage; resist moderate earthquakes without structural damage, but with some non-structural damage; resist major earthquakes of the intensity or severity of the strongest experienced in California, without collapse, but with some structural as well as non-structural damage. In most structures, it is expected that structural damage, even in a major earthquake, could be limited to repairable damage. (Structural Engineers Association of California).

Fault Rupture Study Zones (See Plate 1, inside back cover).

One-Quarter Mile Fault Study Zone

The engineering geologic and soil engineering Fault Study Zone should be established 1/8-mile on either side of a known or assumed trace of the nearest potentially active fault. This study zone boundary may be increased or reduced in size depending upon the following criteria:

- Multiple fault traces or branches.
- Ease in identification of the zone by utilizing street boundaries or other physical landmarks.
- Sufficient data concerning the subject study zone has been gathered to justify a narrower or wider zone.

Proximal Fault Study Zone

The area within 50 feet of an active or potentially active fault trace as determined by the quarter mile study shall be known as the Proximal Zone. This special study zone shall be considered to be underlain by the fault or branches of the fault. Construction of habitable structures shall be regulated within this potential rupture zone. Detailed engineering geologic and soil engineering investigations may be required, based upon extensive subsurface exploration, laboratory testing and current state of knowledge.

Engineering Investigation Reports

Comprehensive geologic-seismic design-foundation engineering investigations shall be submitted for all new critical facilities (Importance Factors 1 and 2) regardless of location and structures of Importance Factor 3 to be located in the detail study areas designated on the plates. These detailed investigations should include, but not be limited to, consideration of the following:

- Fault proximity — defined as an evaluation of all the active and potentially active faults which have the capability of generating a

moderate or greater earthquake during the lifetime of the proposed structures. Additional data needed are distance to active faults, seismic history of the area, and potential for surface ground rupture due to faulting.

- Characteristics of the foundation materials — defined as an evaluation of the foundation materials on the basis of detailed subsurface exploration, laboratory testing, and/or geophysical studies. A determination of the static and dynamic physical properties of these underlying materials, their extent, depth to groundwater, and depth to bedrock are parameters needed to assess the site's seismicity.

- Ground failure potential — defined as an evaluation of the site's susceptibility to failure of the ground surface due to landsliding, liquefaction, differential dynamic settlement, and ground lurching.

- Estimated earthquake parameters of bedrock motion — bedrock motion parameters for the site can be estimated from developed empirical methods. Some important earthquake parameters are:

  Maximum probable earthquake or design earthquake consistent with policy risk levels.

  Maximum bedrock acceleration (g), velocity (in/sec), and displacement (inches).

  Duration of strong shaking.

  Predominant period of bedrock motion.

- Ground motion spectrum — the influence of ground shaking on engineering structures is customarily portrayed by means of a response spectrum curve. Response spectra curves are derived by an engineering seismologist utilizing geodynamic earthquake parameters characteristic of the bedrock underlying the site. A quantified description of the vibratory effect of the ground acceleration on buildings is obtained by such response spectra curves.

Land Use

The safest locations should be reserved for the following uses, in order:

- dams and reservoirs
- hospitals
- emergency facilities (police and fire)
- schools
- utilities and transportation facilities, including rapid transit
- multi-story buildings (highrise)
- correctional facilities
- low-rise structures

Special zoning districts (open space or hazardous districts) shall be employed where appropriate.

OBJECTIVES OF THE PLAN

1. To encourage public awareness of earthquake and other geologic hazards and protection measures.

2. To ensure that structures for human occupancy, critical structures such as dams and hospitals, and other vital emergency facilities are designed to minimize damage from potential earthquake forces so as to continue to function.

3. To ensure that the City's emergency communications network and operating center remain functional after a major seismic disaster.

4. To reduce the risk of life and property loss and interruption of essential services in the event of a seismic occurrence.

5. To evaluate levels of risk with respect to earthquake damage and costs of corrective measures to mitigate or prevent future damage.

6. To determine the relative seismic risk in various parts of the City as a guide to new development and hazard abatement of existing structures.

7. To minimize potential nonstructural damage from ground shaking or other seismic failure mechanisms.

8. To guide in the determination of future land uses within zones of potentially higher seismic risk.

9. To facilitate post-disaster recovery.

10. To assure the sound and rational reconstruction of Los Angeles following a major disaster.

I. GEOLOGIC EVALUATION

Policies

It is the City's policy that:

1. The City continue to evaluate geographic areas to determine the level of earthquake risk.

2. The City utilize geologic and seismic criteria in determining land use policies and making decisions on development, particularly in identified study areas.

Programs

1. Consider the creation of an Earthquake Technical Advisory Committee comprised of representatives from recognized professional societies to assist in the periodic review of the seismic safety plan to assure that the plan remains current with existing levels of knowledge.

2. City geologists and soils engineers should periodically review data and update maps in order that such knowledge can be incorporated in the Municipal Code.

3. City geologists and soils engineers should investigate probable liquefaction areas of the City and develop maps of all potential liquefaction areas.

4. Maintain a cooperative effort with the appropriate State and Federal agencies on trenching, instrumentation of microseismic activity, and other subsurface explorations to gain a better understanding of the precise locations and relative degrees of activities of various faults.

5. Continue studies of the topographic and stratigraphic records of the past histories of identified faults within the City including their effect on groundwater flow to determine their level of seismic activity.

6. Consider expanding the current program of placing strong motion recording instruments (accelerographs) in highrise buildings to fire and police stations or other public facilities where continuous monitoring would be available in order to obtain an immediate representation of site responses in diverse geographical areas throughout the City.

7. Request the Federal or State government to assure continual monitoring and maintenance of accelerographs located within the City.

8. Recommend continuing research on soil dynamics and structural responses to earthquake effects.

9. Conduct a study to designate a central collection agency and design a method for standardizing information in geologic and soils reports to facilitate computerization and retrieval of geologic and soils data.

10. Study the damage potential to harbor installations and small craft in the event of a locally-created seiche.

11. Investigate the breakwater and dikes in the harbor area for adequacy of protection against tsunamis.

II. EXISTING DEVELOPMENT

Policies

It is the City's policy that:

1. Public facilities be upgraded to meet the risk requirements for seismic safety. (See also Critical Facilities)

2. A program be developed to evaluate and upgrade selected existing freeway structures to an acceptable degree of seismic safety.

3. Selected existing City street and highway structures be upgraded to an acceptable degree of seismic safety.

4. Buildings that do not meet requirements for seismic safety be strengthened or abated in an orderly manner.

5. Priorities for seismic upgrading of existing buildings be based on hazard to life, type of occupancy, the location of the structure and the capability of the structure to withstand earthquake forces.

6. Earthquakes and earthquake damage be monitored and assessed to determine future regulations and programs.

7. The public be made aware of seismic hazards and how to reduce the risk to lives and property.

8. Residents of hillside lots be encouraged to take steps to reduce the risk of landslides by proper maintenance.

9. The architectural character of buildings and structures important to the cultural heritage of the City be preserved, consistent with life safety considerations.

Programs

1. Continue the present effort of conducting structural reviews of all City-owned buildings for their potential disaster utility and for structural adequacy.

2. Systematically upgrade or replace all City-owned buildings to meet seismic policy risk criteria.

3. Request Federal or State assistance to implement the corrective measures required.

4. Request seismic safety assessments of governmental structures not under City control (e.g. County, State, and Federal).

5. Identify streets, highways and freeways which constitute a link in a vital transportation route and need to remain open following a disaster.

6. Identify, evaluate and upgrade or replace selected City street and highway structures to an acceptable degree of seismic safety.

7. Continue to make the seismic safety condition of existing structures an important factor in selecting future areas for redevelopment.

8. Continue additional research on methods for repair of damaged buildings.

9. Develop a schedule to undertake a systematic time-phased program within the life of this plan to strengthen or abate structures that do not meet requirements for seismic safety commensurate with policy risk levels.

   a. Give priority to pre-1934 unreinforced masonry structures, starting with structures which are most hazardous to life.

   b. Consider amending the Building Code to provide for a special rehabilitation code in evaluating existing pre-1934 unreinforced masonry structures on their ability to meet an acceptable degree of seismic safety.

   c. Actively pursue Federal and/or State funds, including amending existing legislation, to provide financial assistance to affected owners, persons and businesses to be displaced.

d. Consider enacting an ordinance to require building owners to conduct structural surveys and/or seek State or Federal funding to implement structural surveys for the identification of structures that do not meet lateral force requirements.

e. Encourage the development of low- and moderate-income relocation housing to facilitate the abatement of multiple residential buildings that do not meet lateral force requirements.

f. Expand the City's relocation program to include relocation assistance, counseling and referral services for persons and businesses displaced by major repair or demolition of seismically-unsafe buildings.

10. Continue to control the uses and occupancies in seismically-unsafe buildings by limiting them to the present or less hazardous occupancies.

11. Encourage firms repairing elevators and other non-structural elements after a major earthquake to continue to assist the Department of Building and Safety in gathering earthquake damage data.

12. Continue the information program to educate the public on the need to resist earthquake effects by being prepared for disaster, and on procedures to follow during and after an earthquake, etc.

13. Continue the educational and information program on the responsibility of hillside residents to maintain slope stability by proper grading, planting, avoiding excessive watering, etc.

14. Continue the Parapet Abatement program to completion.

III. NEW DEVELOPMENT

Policies

It is the City's policy that:

1. Geologic and seismic criteria and soils information be used as a determinant of appropriate new development and type of construction in designated study areas.

2. Buildings be designed to compensate for seismic hazards, and to meet requirements based on risk, type of occupancy, and location.

Programs

1. Prohibit the construction of any building designed for human occupancy and/or designated for emergency use astraddle the surface trace of known active or potentially active faults as determined by geologic and seismologic investigations of the specific site.

2. In designated study areas, require geologic and/or soils reports, as necessary, prior to the issuance of a building permit.

3. Maintain the program of updating the seismic regulations of the Building Code to reflect the effect of accelerations, deformations, and strengths of structures subjected to strong ground shaking.

4. Seek legislation requiring Federal, State, and County buildings within the City to meet the City's seismic safety construction criteria.

5. Request the County Health Department to require that hospitals and convalescent facilities be supplied with emergency potable water.

6. Continue to study the adequacy of standards for structural materials to be used in Los Angeles.

IV. NON–STRUCTURAL ELEMENTS

Policies

It is the City's policy that:

1. Anchoring of non-structural elements that could cause damage in the event of earthquake be encouraged.

Programs

1. Support State legislation to require anchoring for mobile homes.

2. Inform the public of potential dangers from unanchored furniture, shelving, equipment, machinery, etc. in the event of earthquake.

V. CRITICAL FACILITIES

(See also NEW DEVELOPMENT and TABLE 1)

Policies

It is the City's policy that:

1. Critical facilities be designed and operated in a manner to maximize their ability to remain functional after an earthquake.

2. Existing critical facilities be examined in an orderly manner and be strengthened or demolished where found to be hazardous.

Programs

1. Prohibit the construction of critical facilities across the trace of a known active or potentially active fault.

2. Limit the construction of critical transportation structures across the trace of a known active or potentially active fault to those which cannot reasonably be constructed at another location.

3. Continue to design utility systems, and other critical facilities for which there is a public need that they survive an earthquake in operable condition (such as police and fire stations) to a higher standard of performance than other buildings and facilities.

4. Design utilities crossing fault zones to minimize damage by utilizing such measures as flexible units, valving, redundant lines, or automatic valves operated by differential pressures.

5. Continue to maintain redundancy in the City's utility systems and provide dispersed crews and supplies for emergency repairs.

6. Require emergency centers such as large hospitals and communications centers to have alternate cooling water systems for electric generators that are not dependent on City mains for supply and alternate generators for power.

7. Conduct a structural review of all City critical facilities and especially fire stations and include a detailed geologic site investigation and, if necessary, a review of access roads and utilities serving the sites. Require upgrading as determined by the reviews.

8. Continue to meet seismic standards for dam safety as promulgated by the State Division of Safety of Dams as applicable to new and existing structures.

9. Seek legislation to ensure that freeway facilities within earthquake-prone urban areas have the highest level of seismic safety.

VI. EMERGENCY PREPAREDNESS

It is the City's policy that:

1. Emergency plans dealing with disaster response be continually maintained and revised.

2. The City coordinate with all other governmental agencies charged with disaster and emergency preparedness responsibilities.

3. The public be kept informed of what to do in the event of a seismic disaster.

4. Property owners be encouraged to take adequate steps to protect their property against the economic risks of seismic hazards.

Programs

1. Continue to conduct periodic exercises to ensure that all City departments respond efficiently and that the emergency communications network, emergency control center, and reconnaissance systems are properly maintained.
2. Continue to maintain emergency evacuation plans for identified potential flooding areas downstream of dams.

3. Develop interim disaster plans assuming many freeway bridges and City bridges will not be functional following a major earthquake.

4. Seek Federal aid to establish an emergency communication system for disaster inspection teams in the Department of Building and Safety.

5. Cooperate with the Office of Civil Defense in disseminating information on procedures to be followed in the event of earthquake.

6. Maintain and expand agreements for emergency assistance from other jurisdictions to ensure adequate aid in time of need.

7. Consider posting all buildings over three stories in height with instructions on safety measures and evacuation suggestions to be used during and after an earthquake, similar to what is now done for civil defense.

8. Begin formulation of procedures to be followed in the event earthquake prediction becomes a reality, such as determining the agency from which predictions would be accepted.

9. Include in appropriate telephone books tsunami emergency procedures with information on warning devices, zones of possible inundation, evacuation routes, and location of relief centers.

10. Encourage the lending and insurance industries to advise fire and homeowner policy holders of insurance provisions relating to earthquakes, floods and mudslides.

VII. POST–DISASTER RECOVERY

Policies

It is the City's policy that:

1. Following a major disaster, the City be rebuilt in accordance with established general plan objectives and policies and appropriate City codes.

2. Psychological relief after an earthquake be provided by appropriate agencies.

Programs

1. Create a reconstruction planning committee to ensure that development following a major disaster takes place in a timely manner according to established objectives, policies and procedures.

2. Urge that a comprehensive school disaster planning program include such factors as reuniting children with parents as quickly as possible after an earthquake.

3. Urge the County to establish and use mental health teams for psychological counseling to alleviate trauma after an earthquake. Such teams should be activated as part of the emergency response program.

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photo from "Earthquake Country"

design and layout: richard v. david

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*former unit head

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PLATE I FAULT RUPTURE STUDY AREAS

PLATE II SLOPE STABILITY STUDY AREAS

Active fault with ground surface rupture during February 9, 1971 earthquake

Active fault – has shown evidence of historic activity [2] (MOVEMENT DURING PAST 11,000 YEARS)

Potentially active fault [3]

Potentially active fault, precise location and/or existence uncertain

Detail Study Area [4]

PLATE I

FAULT RUPTURE STUDY AREAS

ACTIVE AND POTENTIALLY ACTIVE FAULTS

PREPARED BY THE DEPARTMENT CITY PLANNING

MARCH, 1975

Apr. 1972
Jan. 1970
June 1965
June 1962

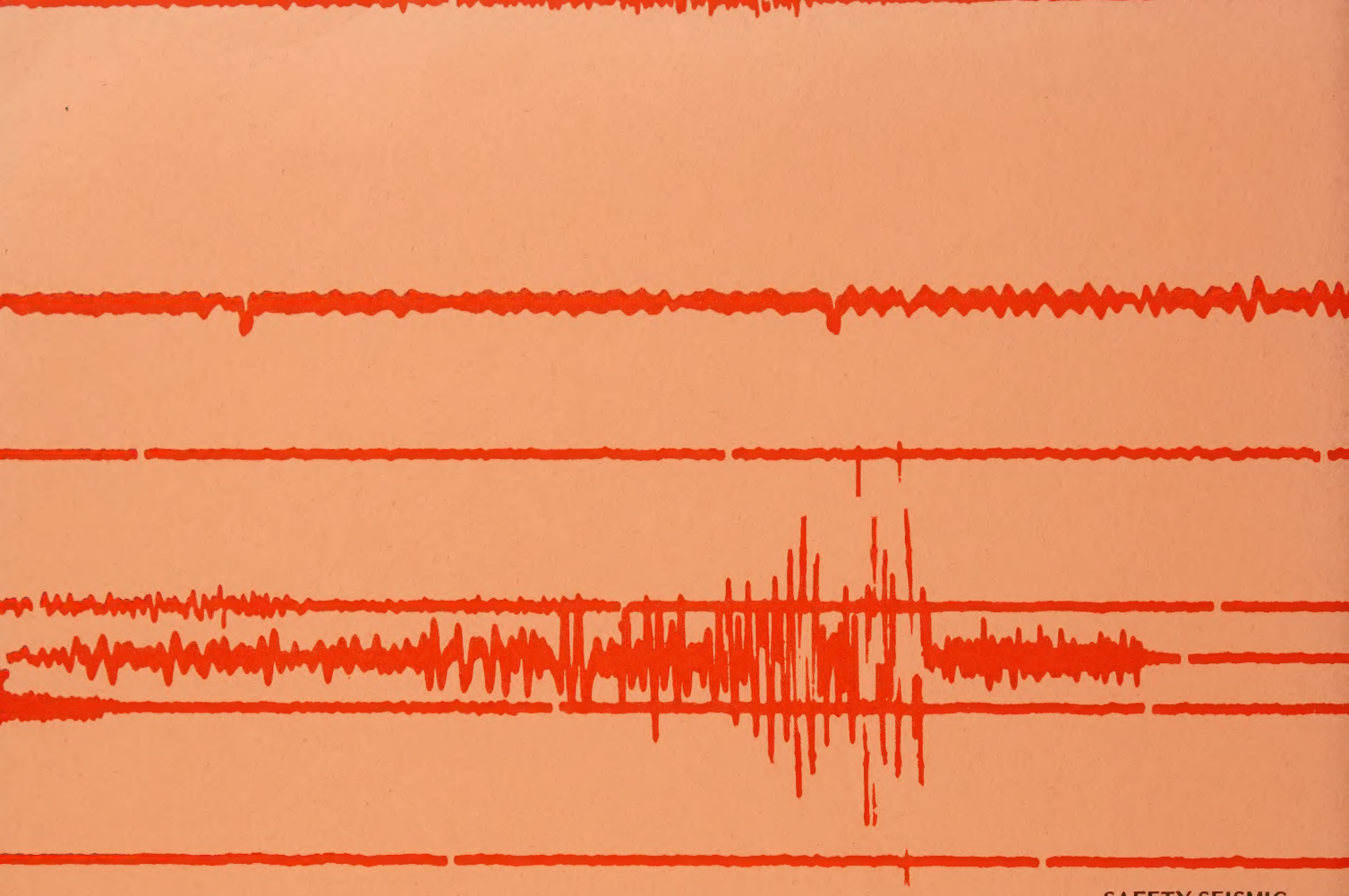
MILES 0 2

Study Areas

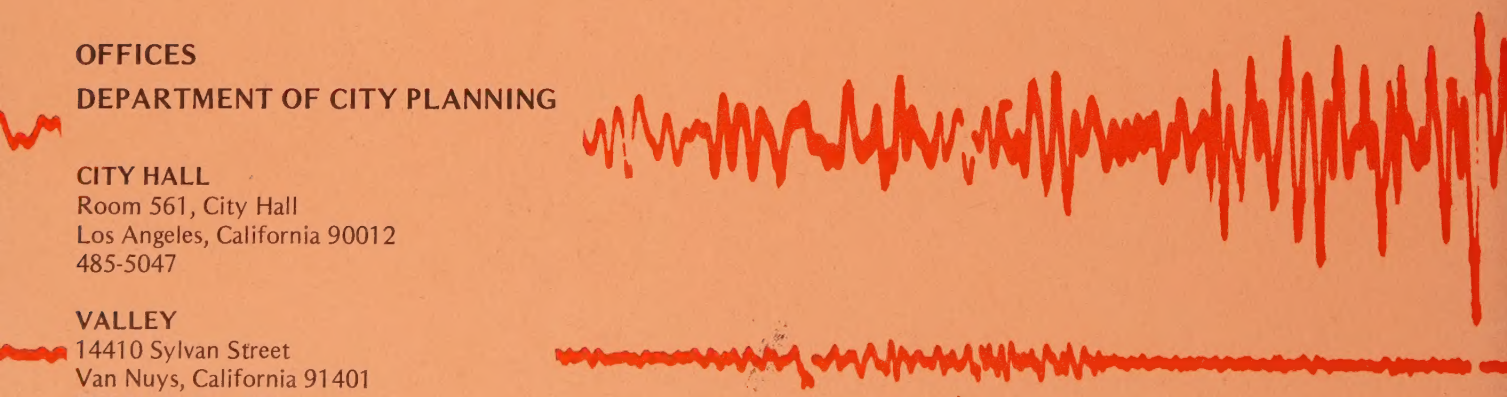
PLATE II

SLOPE STABILITY STUDY AREAS

Apr. 1972
Jan. 1970
June 1965
June 1962



SAFETY SEISMIC
PLAN



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